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Abstract. Little Wall Lake, Hamilton County, Iowa, was dredged in 1953 to increase recreational facilities. Counts in June-August 1967 averaged about 580 man-hours of boating and water skiing per acre, mostly in the 65-acre dredged portion, but sometimes in other parts of the 273-acre lake. The lake also provides about 500 man-hours of fishing per week. Most of the fish are black bullheads (*Ictalurus melas*) and crappies (*Pomoxis annularis* and *P. nigromaculatus*), 5 to 6 inches long, and too small to be kept by most fishermen. The angler catch of largemouth bass (*Micropterus salmoides*), bluegills (*Lepomis macrochirus*), and other games fish large enough to be kept was less than 0.1 per hour. Mark and recapture techniques estimated the bullhead population at 1,703 per acre, or 123 pounds per acre. Bullheads collected after July 15 were thinner than those collected earlier, but black and white crappies increased in weight. The fish population had not changed markedly since 1956.

Little Wall Lake (R24W, T86N, Sec. 9, 10, 15 and 16) in Hamilton County, Iowa, is a shallow prairie lake of approximately 273 acres. It is reported to have been dry in 1892, 1904-5, and 1936-41 (Carlander and Sprugel, 1955). In 1953, about 65 acres were dredged by the State Conservation Commission to maintain deeper water for recreation. In 1956, because of the drouth, the dredged portion was about the only area with water, but water levels increased until the lake was full by 1962. Water levels have been maintained near the maximum by pumping water from a drainage ditch at the north end when necessary. Facilities for pumping ditch water into the lake were completed in the fall of 1961. Weller and Spatcher (1965) describe the changes in aquatic plants and of birds nesting in the emergent vegetation from 1958 to 1962. In 1967, most of the lake was free of emergent vegetation, about as reported for 1962. Submerged vegetation (*Potamogeton* spp., *Chara* sp., *Myrophyllum vertiallatum* and *Anacharis* sp.) was abundant in water 2-5 feet deep.

Carlander and Sprugel (1955) reported on the fish population from 1945 until 1953 when the lake was dredged. Birkenholz and Fritz (1956) described the population in 1956 when the fish were mostly limited to the dredged area. Our field observations were from June 9 to August 20, 1967.

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Recreational Use of the Lake

Since the dredging and refilling, Little Wall Lake has been heavily used for boating and water skiing. To estimate this use, we counted the number of boats of various categories at half-hour intervals on days pre-selected so that the weather effects could be considered random. The Saturday counts were combined with those of the other weekdays since they did not differ greatly, but the Sunday counts were kept separate (Figures 1 and 2). Although the number of days on which counts were made were limited, it is believed that they were fairly representative, and indicate about 52 boat-hours per weekday and 269 boat-hours per Sunday. The maximum count, 37 boats on the lake at one time, is known to have been exceeded on some other Sundays and holidays. Most of the boating and water skiing are in the 65-acre dredged area. Safe limits for water skiing and power boating were exceeded on a number of occasions. Downing (1967) reports minimum safety limits as 5.5 acres per boat and skier and 3.5 acres per sail or power boat.

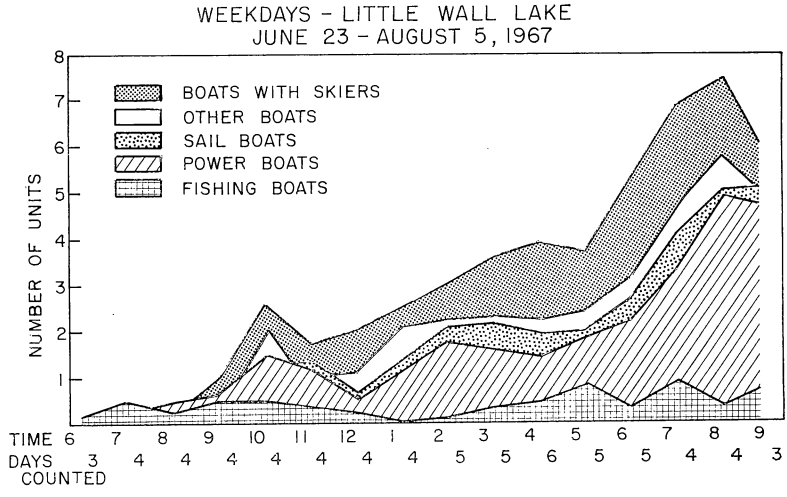

Figure 1. Average numbers of boats of various categories on Little Wall Lake at each hour on weekdays. Saturdays were included since the counts did not differ from the other days.

On the basis of these counts, and estimating two fishermen per boat, the lake provided 13 man-hours of fishing per weekday and 30 man-hours per Sunday. In addition, bank fishing was estimated from counts on three days at 48 hours per weekday. If bank fishing on Sundays were twice as much (the boat fishing was twice as great on Sundays, and counts one Sunday morning indicated more than twice the weekday average), the lake provided about 500 man-hours of fishing per week—or about 18 man-hours per acre in the 10-week period.

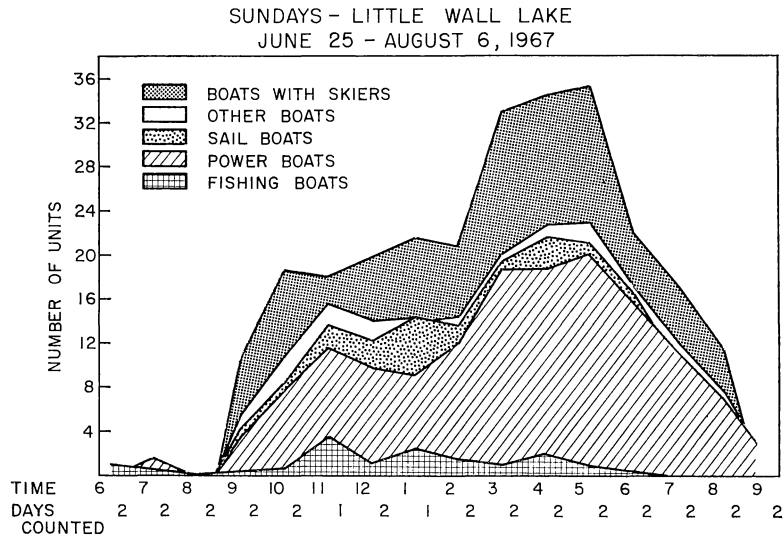

Figure 2. Average numbers of boats of various categories on Little Wall Lake at each hour on Sundays.

Interviews with fishermen indicated that, in 299 hours of fishing, they caught 11 largemouth bass (+8 returned to the lake), 17 bluegills (+2 returned to the lake), 13 white crappies, 15 black crappies and over 415 black bullheads, many of which were returned to the lake as too small to keep. Other largemouth bass, pike, and channel catfish were caught by anglers not interviewed. Only 15 percent of the 192 fishermen interviewed lived within 10 miles of the lake, and 44 percent came from Des Moines, Ames, and Boone.

The Fish

Lengths, weights, and scales were collected from fish caught in experimental gill nets, seines, wire traps and during the creel census. Most of the gill netting had to be done in the marginal areas because of the intensive boating.

Black bullheads, *Ictalurus melas*, were the most abundant species in each type of gear. Most were 5 to 6 inches long although three were 11.1 to 12.6 inches. In an attempt to estimate the population, 2,684 were marked by clipping the pelvic fin and released again in the lake. Of 1,213 bullheads caught later, seven were marked, and the total population was estimated at 464,869. During the marking, six bullheads were found without pelvic fins. Dr. K. D. Carlander stated that bullheads lacking pelvic fins were also found in farm ponds during a study in 1948. The bullheads averaged about 14 to a pound, and the population of 1,703 bullheads per acre was thus equivalent to 123 pounds per acre.

The average condition factor, C(TL) of 140 black bullheads was 39.5, which indicates that the bullheads were thinner than in 1956, when the average was 49.7 (Birkenholz and Fritz, 1956), and in 1948-50 when the average was 44.5 (converted from K(SL) averages for fish 121-140 mm. in Carlander and Sprugel, 1955). In all three periods most of the bullheads were 5-6 inches long. The two largest bullheads in 1967, at 12.4 and 12.6 inches, weighed over a pound each. The bullheads collected after July 15 were thinner, though perhaps a little longer, than those collected before (Table 1).

Table 1

Lengths, Weights, and C(TL) of Black Bullheads, Little Wall Lake, 1967

Total Length in Inches	June—July 14				July 15—August 10			
	No.	Weight in Grams		C(TL)	No.	Weight in Grams		C(TL)
		Mean	Range			Mean	Range	
5.2	1	27	——	42				
5.3	1	29	——	43	1	26	——	38
5.4	8	26.5	25-30	37	1	27	——	38
5.5	14	28.4	24-37	38	9	27.3	24-33	36
5.6	21	29.3	24-39	37	25	27.7	20-36	35
5.7	16	35.0	26-44	42	27	30.4	26-40	36
5.8	38	35.0	27-45	40	32	32.5	28-41	37
5.9	18	38.1	28-44	41	14	33.6	26-40	36
6.0	12	40.8	33-50	42	20	35.3	24-46	36
6.1	4	45.5	41-51	44	7	38.3	33-43	37
6.2	2	41.5	40-43	39	9	36.9	27-44	34
6.3	5	46.6	38-52	41	2	42.5	41-44	38
6.4	—	—	——	—	2	39.5	37-42	33
7.4	—	—	——	—	1	85	——	46
12.4	1	53.6	——	62	—	—	——	—
12.6	1	58.4	——	65	—	—	——	—

Three channel catfish, *I. punctatus,* 19.2-20.5 inches long, were taken in gill nets. Fingerling catfish were stocked by the Iowa State Conservation Commission in 1962 and 1963. Two channel catfish were also collected in 1956, although there were no records of stocking at that time.

Seven carp, *Cyprinus carpio,* 11.8-14.0 inches total length, were taken in gill nets. Scale examination indicated that these were age I and thus of the 1966 year class. Carp of the 1955 year class were quite abundant in 1956.

No study was made of minnows although it is known that some are present.

Seven white suckers, *Catostomus commersoni,* were taken in gill nets and one in the seines. These suckers were 17.2-18.2 inches total length except for one at 13.7 and one at 15.1 inches. Suckers were also collected in the earlier studies.

Three pike, *Esox lucius,* 3.3-8.5 pounds, were taken in gill nets. The Iowa State Conservation Commission stocked pike fry each year

1962-67. Fry and 200 adults were also stocked in 1954-56, but none were collected in the 1956 study (Birkenholz and Fritz, 1956).

One walleye, *Stizostedion vitreum,* 3.5 pounds, was taken in the gill nets though we have no reports of stocking of this species in recent years nor were walleyes found in the earlier studies.

Green sunfish, *Lepomis cyanellus,* were taken in seines and in the wire traps. These were 3.5-5.5 inches long, about the same size as those collectedi n 1956 but smaller than in 1948 (Sprugel, 1955).

Bluegills, *L. macrochirus,* were taken in only moderate numbers (9 in gill nets, 4 in seines and 19 by anglers). They were 6.5-7.6 inches long, and scale examination indicated they were at ages III and IV. The average C(TL) of 17 bluegills was 74, a bit lower than the average, 83, reported for 1956, when bluegills were apparently not as abundant since only six were taken (Birkenholz and Fritz, 1956). Bluegills were stocked in 1954.

Eight pumpkinseed sunfish, *L. gibbosus,* were taken in the seines. None were reported in the earlier studies, nor are there records of stocking this species.

White and black crappies, *Pomoxis annularis* and *P. nigromaculatus,* were, respectively, second and third in abundance, after the black bullhead. White crappies were abundant in 1956, but no black crappies were identified at that time. Prior to dredging only two crappies, both black, were reported (Carlander and Sprugel, 1955). Crappies were stocked by the State Conservation Commission in 1954, 1962, and 1963. The crappies in 1967 were mostly 5.0-5.8 inches long and thin (Table 2). The average weight for the 5.0-5.8-inch crappies was 22 grams for the white crappies and 24 grams for black crappies compared with the average from many populations of 34 grams for each species (Carlander, 1953). Most of the white crappies in 1956 were 8.0-9.9 inches long and in relatively good condition with an average C(TL) of 49 (Birkenholz and Fritz, 1956).

Largemouth bass, *Micropetrus salmoides,* were taken in gill nets, seines, wire traps, and creel census and were quite common in 1967, as they were in 1956. Advanced fry or fingerlings were stocked in 1954, 1955, 1960, and each year 1962-67. After the bass fingerlings were stocked on July 26, 1967, we saw schools of small bass around the shore for a few days. On July 28, we seined 27 bullheads and 40 crappies from places where the young bass had been stocked and found no evidence that these fish were eating young bass. In addition to the young bass, we examined several bass 4.1-4.7 inches long, three bass 7.8-9.0 inches, five bass 12.0-14.5 inches, and eight bass 15.2-17.8 inches long. When the 4-5-inch bass were put in aquaria, they showed such intolerance of each other that only one could be kept alive per 10-gallon aquarium, unless a screen kept them apart.

Table 2

Lengths, Weights, and C(TL) of Crappies, Little Wall Lake, 1967

Total Length in Inches	June—July 14				July 15—August 10			
	No.	Weight in Grams		C(TL)	No.	Weight in Grams		C(TL)
White crappie		Mean	Range			Mean	Range	
4.5	1	12	——	29	—	—	——	—
5.1	—	—	——	—	1	23	——	38
5.2	6	18.8	18-20	30	1	24	——	38
5.3	13	19.7	16-24	29	2	22.5	19-26	33
5.4	12	20.3	14-24	29	6	24.0	22-26	34
5.5	17	21.6	18-25	29	6	23.3	19-26	31
5.6	9	21.6	17-25	27	7	24.1	22-26	30
5.7	3	24.0	22-26	29	4	26.5	25-29	31
5.8	1	21	——	24	5	27.2	26-30	31
6.2	1	30	——	28	—	—	——	—
Black crappie								
4.9	1	15	——	29	—	—	——	—
5.0	6	20.3	16-22	36	—	—	——	—
5.1	3	20.3	19-21	33	—	—	——	—
5.2	8	22.9	20-26	36	2	24	23-25	38
5.3	4	22.2	21-25	32	1	24	——	35
5.4	4	25.2	22-38	35	1	25	——	36
5.5	4	25.2	23-28	33	3	29.7	28-31	39
5.6	1	26	——	33	—	—	——	—
5.7	—	—	——	—	1	30	——	35
5.8	—	—	——	—	1	34	——	39

During aggression, a reddish brown area appeared at the base of the caudal fin of the subordinate bass.

Conclusion

Crappies and bullheads were over-abundant, small and thin, in Little Wall Lake in 1967. Bullheads had also been small in 1956, but the crappies in the lake at that time were larger. Largemouth bass and probably the pike appear to be doing well, but provide only limited fishing. Boating activity is such as to discourage some fishermen, particularly those interested in casting for bass.

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